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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,125	10/23/2003	Yasuaki Nagashima	03643/LH	2145

1933 7590 12/29/2004

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EXAMINER	
BREWSTER, WILLIAM M	

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 12/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/692,125	NAGASHIMA ET AL.	
	Examiner	Art Unit	
	William M. Brewster	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 12-20* is/are rejected.

7)☒ Claim(s) *6-11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *102303*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Yano et al. JP Patent No. 55-80388.

Yano anticipates a semiconductor light emitting device comprising: in fig. 1, a semiconductor substrate formed from InP 1; an active layer formed at the upper side of the semiconductor substrate; and an n-type cladding layer formed from InGaAsP 3 and a p-type cladding layer formed from InP 5, which are formed so as to hold the active layer 4 there between, wherein, the semiconductor light emitting device given that a refractive index of the n-type cladding layer na, and a refractive index of the p-type cladding layer nb, set so as to be the relationship of na > nb in which the refractive index na of the n-type cladding layer is higher than the refractive index nb of the p-type cladding layer, and due to the distribution of light generated by the active layer being deflected the n-type cladding layer side, optical loss by intervalence band light absorption at the p-type cladding layer is suppressed, and high-power light output can be obtained, CONSTITUTION;

limitations from claim 3, semiconductor light emitting device

according to claim wherein the active layer 4 includes

a bulk structure structured from one uniform material, CONSTITUTION.

Although Yano never directly states the difference in the refractive indices, they are inherent to the compositions of the material. Proffered as evidence is Harder et al., US Patent No. 5,331,655, who states the n-InGaAsP refractive index as being larger than the p-InP, cols. 3-4, TABLE 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2 -5, 12, 13, 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yano as applied to claims 1, 3 above, and further in view of Applicants' Admitted Prior Art.

Yano does not specify using a SCH, but the AAPA does. The AAPA, teaches limitations from claim 2, a semiconductor light emitting device according to claim wherein the semiconductor light emitting device further comprises: in fig. 13, first SCH 13 (Separate Confinement Heterostructure) layer formed from InGaAsP which is formed between the active layer 14 and the n-type cladding layer 12;

and a second SCH layer formed from InGaAsP 15, which is formed between the active layer and the p-type cladding layer 18, p. 2, lines 4-14;

limitations from claim 4, in fig. 13, a semiconductor light emitting device according to claim wherein active layer includes a plural-layer MQW (Multi-quantum well) structure having plural-layer well layers 14A and plural-layer barrier layers 14B positioned at the both sides the respective well layers the plural-layer well layers, p. 3, lines 3-19;

limitations from claim 5, a semiconductor light emitting device according to claim 2, in fig. 13, wherein the first layer includes a multilayer structure formed from a plurality of layers 13 A-C, the second SCH layer includes a multilayer structure formed from a plurality of layers, 15 A-C;

limitations from claim 12, the semiconductor light emitting device according to claim 2, in fig. 12, wherein emitting device is formed so as to be a buried structure, p. 2, lines 16-24;

limitations from claim 13, in fig. 12, a semiconductor light emitting device according to claim wherein the n-type cladding layer, the first SCH layer, the active layer, the second SCH layer, and a part the p-type cladding layer are formed to be a mesa type, and the semiconductor light emitting device further comprises: a first buried layer formed from p-type InP 16 such that one surface thereof contacts the semiconductor substrate or the n-type cladding layer at the both sides of the respective layers formed to be a mesa type; and a second buried layer formed from n-type InP 17 such that one surface thereof contacts

the p-type cladding layer and the other surface thereof contacts the other surface of the first buried layer at the both sides the respective layers formed to be a mesa type, p. 2, lines 6-27;

limitations from claim 19, a semiconductor light emitting device according to claim 1 wherein, in fig. 12, when the semiconductor substrate 11 is n-type, the n-type cladding layer 12 is formed at the lower side of the active layer 14, and the p-type cladding layer 18 is formed at the upper side of the active layer, p. 2, lines 6-7;

limitations from claim 20, a semiconductor light emitting device according to claim wherein, when the semiconductor substrate is p-type, the n-type cladding layer is formed at the upper side of the active layer, and the p-type cladding layer is formed at the lower side of the active layer: although the AAPA does not specify an inverse doping structure, it is well-known in the art that inverting all the charges in a structure is commonplace.

The AAPA gives motivation on p. 2, lines 21 - p. 2, line 4. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining the AAPA's invention with Yano's invention would have been beneficial because it gives a high-power light output characteristic.

For claims 16-18, neither Yano nor the AAPA specify the wavelength of the cladding, the width of the active layer, or the power of the LED, however these dimensions may be optimized.

"Normally, it is to be expected that a change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art . . . such ranges are termed 'critical ranges' and the applicant has the burden of proving such criticality . . . More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

In re Aller 105 USPQ 233, 255 (CCPA 1955). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising there from. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Claims 14-15 rejected under 35 U.S.C. 103(a) as being unpatentable over Yano as applied to claims 1, 3 above, and further in view of Shimizu et al., US Patent No. 5,920,079.

Yano does not specify using a ridge structure, but Shimizu does. Shimizu teaches

limitations from claim 14, in fig. 1, a semiconductor light emitting device according to claim wherein the semiconductor light emitting device formed so as be a ridge structure, col. 8, lines 36-58;

limitations from claim 15, a semiconductor light emitting device according to claim 14, wherein, when the semiconductor substrate 1 n-type, the p-type cladding layer 6 formed as a ridge structured portion in which the substantially central portion at the outer side thereof heaped to the upper side, and the semiconductor light emitting device further comprises: a contact layer 7 formed at the upper side of the ridge structured portion at the p-type cladding layer; an insulating layer 8 formed so as to open the central portion of the contact layer and so as to cover the p-type cladding layer including the ridge structured portion; and an electrode 10 formed at the top portion of the insulating layer in a state in which one portion thereof is connected the contact layer.

Shimizu gives motivation on col. 8, line 60 - col. 9, line 3. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining Shimizu's invention with Yano's invention would have been beneficial because it results in adequately raised differential gain.

Allowable Subject Matter

Claims 6-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William M. Brewster whose telephone number is 571-272-1854. The examiner can normally be reached on Full Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

William M. Brewster

22 December 2004
WB